

# **CHEMICAL INKJET PRINTER CHIP-1000**

## **INSTRUCTION MANUAL**

BE SURE TO READ THIS INSTRUCTION MANUAL THOROUGHLY  
PRIOR TO OPERATING THIS EQUIPMENT. ALSO, BE SURE TO  
STORE THIS INSTRUCTION MANUAL IN A CONVENIENT  
LOCATION WHERE IT CAN BE EASILY FOUND.



# Introduction

Thank you for purchasing Shimadzu's CHIP-1000 Chemical Printer.

This instruction manual includes safety instructions, explains the standard operation environment and provides instructions on the CHIP-1000 unit's usage, maintenance, accessories and optional equipment.

Prior to operating this unit, be sure to read this instruction manual carefully in order to understand this unit's correct operating procedures.

Additionally, after you have read this manual, be sure to keep it near the CHIP-1000 unit, where it can be referred to whenever necessary.

## NOTE

- Be sure you have a clear understanding of the information contained in this instruction manual prior to using this equipment.
- If this instruction manual or any CHIP-1000 unit caution labels are lost, please contact your local sales office immediately for a replacement.
- This instruction manual contains detailed safety instructions to ensure safe operation of the unit. Be sure to read and understand them prior to operating this unit.

## Notice

- This manual is the property of Shimadzu Corporation. No part of this manual may be reproduced in any form or by any means without prior permission from Shimadzu.
- The contents of this manual are subject to change without notice.
- This manual has been prepared with care, however, should any errors or omissions be found, there is a chance that they may not be immediately corrected.

Chemical Inkjet Printer is a trademark of Shimadzu Corporation.

Milli-Q is a trademark or registered trademark of Millipore Corporation in the US and other countries.

Microsoft, Windows, and Excel are trademarks or registered trademarks of US Microsoft Corporation in the US and other countries.

AXIMA is a registered trademark of Shimadzu Corporation.

Copyright © 2003 SHIMADZU CORPORATION

# Warranty Conditions and Customer Service

## Warranty Conditions

1. **Warranty Card**      A warranty card is included with this manual. Be sure to keep this card together with the manual at all times.
2. **Warranty Period (CHIP-1000 Unit)**  
The warranty period is one year, beginning from the installation date. After the CHIP-1000 unit is installed, a Shimadzu serviceperson will fill in the Installation Report and ask the customer to confirm and sign it. The date of the customer's signature on this report shall be considered the date of installation.
3. **Scope of Warranty**      If an equipment failure attributable to Shimadzu occurs during the warranty period, repairs or replacement of parts will be made without charge.  
However, this warranty does not cover damage to samples or reagents incurred by this failure.
4. **Out-of-scope Items**      During the warranty period the following failures are excluded from the scope of the warranty.
  - 1) Failure due to incorrect operation or operation that is not described in this instruction manual.
  - 2) Failure due to equipment disassembly, repair or modification performed by any company other than Shimadzu or a Shimadzu-designated company.
  - 3) Failure due to use of the equipment with hardware or software not designated by Shimadzu.
  - 4) Failure of the equipment and damage to software, including the operating system or data due to computer viruses.
  - 5) Failure of the equipment and damage to software, including the operating system or data, due to a power failure, including power outages and power drops.
  - 6) Failure of the equipment and damage to software, including the operating system or data, due to powering off the equipment without following designated power off procedures.
  - 7) Failure due to problems not related to the equipment.
  - 8) Failure due to operation of the equipment in harsh environments, such as areas with high temperatures, high humidity, corrosive gasses or vibration, or operation in environments other than those described in this manual.
  - 9) Failure due to fire, earthquakes, floods or other natural disasters, contamination by radioactive or harmful substances, or other unforeseeable events such as wars, riots, or criminal acts.
  - 10) Failure due to equipment relocation or transportation after installation
  - 11) Failures due to consumables or related items.

NOTE: Recording media such as floppy disks and CD-ROMs are considered consumables.

## Customer Service

If this equipment fails to operate properly, please refer to 7 Troubleshooting for troubleshooting procedures. If the problem persists or if any other type of problem is suspected, please contact your local sales office immediately.

## Warranty Period (Parts)

The warranty period for maintenance parts for this equipment is seven years, beginning from shipment of the product from the factory. Be aware that maintenance parts may be unavailable after the warranty period. Also, genuine parts produced in any company other than Shimadzu may have a supply period determined by that manufacturer.

# Safety Instructions

## 1. Safety Instructions for Safe Operation

- Prior to using this unit, be sure to read these “Safety Instructions” carefully and operate the equipment within its design specifications.
- The safety instructions given here are important and must be followed.
- This instruction manual classifies safety precautions as follows, based on the potential degree of operator injury and equipment damage.



### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, can result in death, serious injury and/or major equipment damage.



### **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, can result in minor injury, and/or minor equipment damage.

- Minor or moderate injury means neither hospitalization nor long-term medical treatment is required.
- Equipment damage includes damage to the product itself, as well as to items near the product, such as building structures and/or surrounding equipment.

### **NOTE**

Provides clarification and/or useful information.



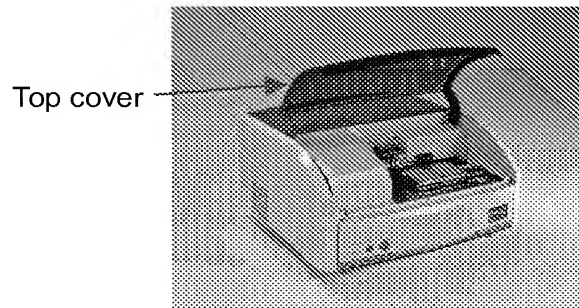
## WARNING

- **Do not repair or modify this product's internal parts.**  
This work should be performed only by personnel who have received special repair-related training from Shimadzu.
- **Do not disassemble or modify this product.**  
Doing so will reduce the product's level of safety
- **Be sure to use only a 100 VAC power supply.**  
Using any other level of power can cause a fire, electric shock or unit malfunction.
- **Do not modify, deform, pull, twist, or place a load on this product's power cable.**  
Any of these actions can cause a fire or electric shock.
- **Be sure to ground this product.**  
Since an electric shock danger exists, be sure to use only power outlets equipped with a grounding terminal.
- **Be sure to install this product in a well-ventilated room.**  
Use of volatile solvents in an airtight environment can lead to operator health problems.
- **Be sure to handle reagents and liquid wastes carefully.**  
When handling reagents or waste liquids that contain toxic or neurologically reactive compounds, be sure to wear protective gloves and goggles.
- **Do not use this product in environments with extreme heat or flames.**  
Operating this product in these environments can cause a fire.
- **Do not put containers with liquids on this product.**  
Spills from these containers can cause leaks from this product's electric parts, resulting in a fire, electric shock or product malfunction.



## CAUTION

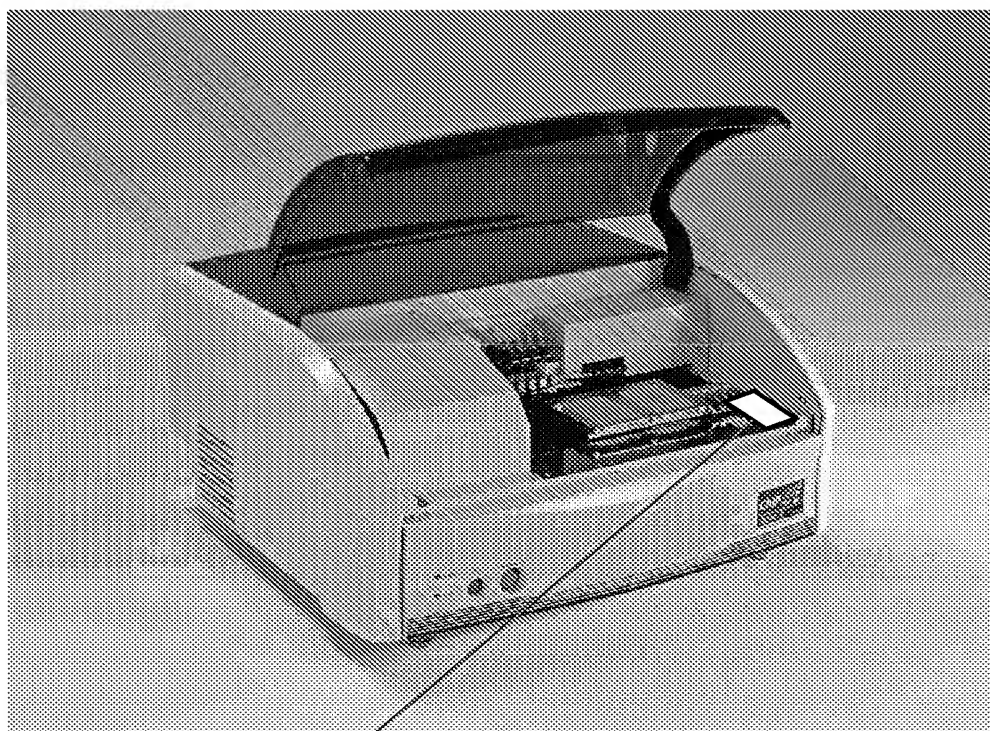
- Do not drop or place heavy objects on the top cover of this product. Doing so can result in operator injury or equipment damage.



- Keep this product's top cover closed during operation.  
Failure to do so can cause an injury.  
If the cover is opened, the product will perform an emergency stop.
- Do not install or move this product.  
Since this product weighs 75 kg, it should be installed or moved only by a trained serviceperson. If the customer installs or moves this product they may be injured and the product's warranty will be voided.
- Since sections of this product (piping, etc.) use PEEK resin, do not use the following solvents. Use of these solvents will weaken the PEEK resin and can lead to cracks or ruptures, which can, in turn, leak solvent inside the product.  
Solvent names:  
Concentrated sulfuric acid  
Concentrated nitric acid  
Dichloroacetic acid  
Acetone  
Tetrahydrofuran (THF)  
Dichloromethane  
Dimethylsulfoxide (DMSO)
- Do not subject this product to excessive shocks or excessive vibration.  
Subjecting this product to excessive shocks or excessive vibration can result in operator injury and equipment damage.
- Be sure to use the procedures described in this manual to start or stop this product.  
If these procedures are not followed, the product's memory may be damaged and the computer system may malfunction.
- Do not move or tilt the product when it is in operation.  
Moving or tilting the product during operation can result in operator injury and equipment damage.



## 2. Warning Labels



- If the top cover of the equipment is opened during operation, an injury may result. If this cover is opened, the CHIP-1000 unit's interlock mechanism will stop the equipment automatically.

### 3. Explanation Labels



Keep the cover closed during operation.  
If it is opened, the equipment will stop immediately.

## 2. Part Names and Functions

### 2.1 Standard Configuration

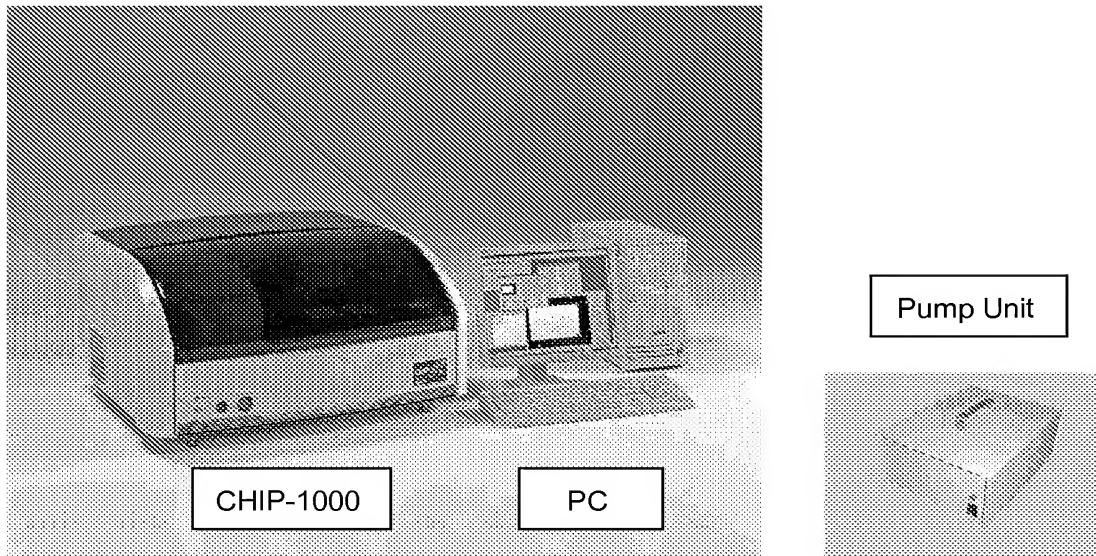


Fig. 2.1.1 CHIP-1000 Appearance and Standard Configuration

Figure 2.1.1 shows the appearance of the CHIP-1000.

Figure 2.1.2 shows the connections between the main unit and external devices. Some personal computers will have an IEEE-1394 port in the motherboard.

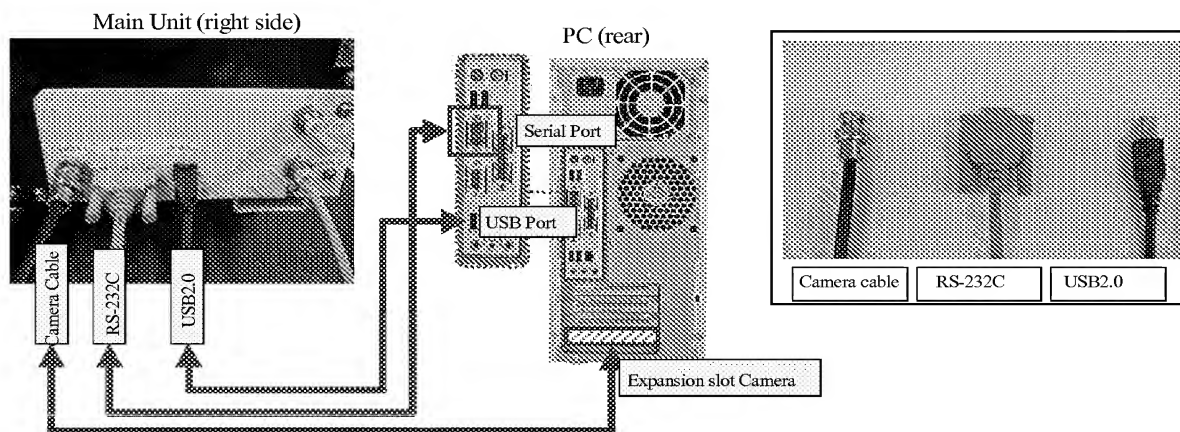


Fig. 2.1.2 Connection Diagram and Cable Layout

## 2. Names and Function of Parts

### 2.2 CHIP-1000 Overview

#### 2.2.1 CHIP-1000 Unit (Front)

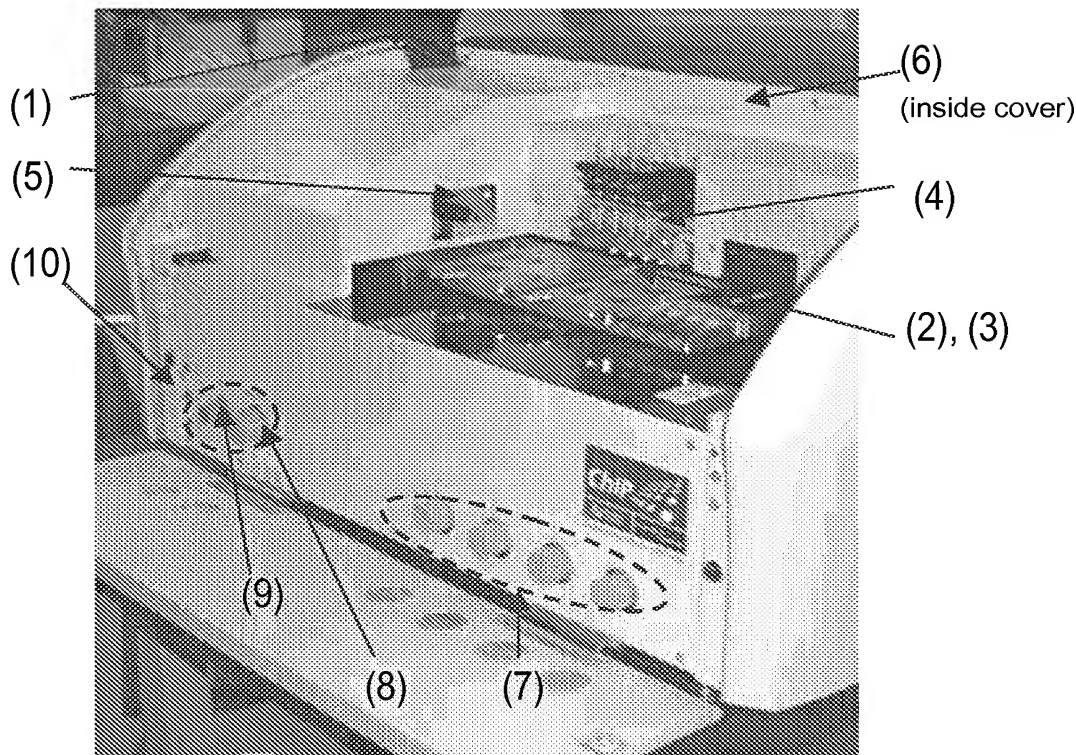


Fig. 2.2.1 CHIP-1000 Unit (Front)

No.	Name	Function
(1)	Top Cover	Protective cover. For details, refer to 2.3.1
(2)	Table	Two sample plates are mounted on this table. For details, refer to 2.3.2
(3)	XY Stage	Moves the sample plate to any specified position. X-direction table movement is lateral movement. Y-direction table movement is longitudinal movement.
(4)	Print Head Unit	Sets or dispenses reagent. For details, refer to 2.3.3
(5)	Camera Stage	Monitors the reagent dispensing and piezo orifice conditions. Images are displayed on the PC monitor.
(6)	Scanner	Acquires the image of a sample to determine a spot to be analyzed with AXIMA.
(7)	Pressure Adjust Knob	Sets a negative pressure used for sample dispensing. For details, refer to 2.3.4.
(8)	Maintenance Button	When this button is pressed, the table moves to the piezo orifice wipe position. For details, refer to 2.3.5
(9)	Stop Button	The current operation will stop if this button is pressed. For details, refer to 2.3.5
(10)	Status Lamp	Indicates power supply, current operation or stop button status. For details, refer to 2.3.5

## 2. Names and Function of Parts

### 2.2.2 CHIP-1000 Unit (Left Side)

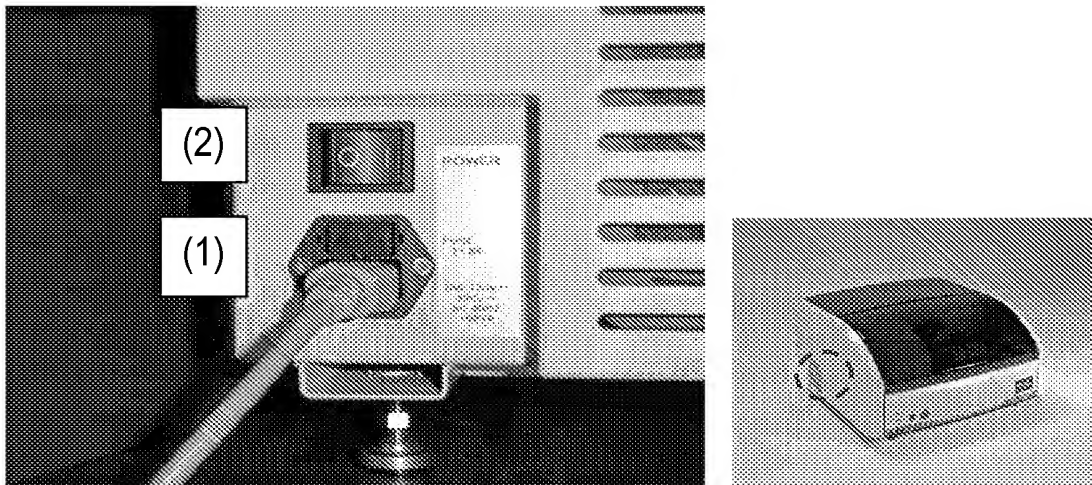


Fig. 2.2.2 CHIP-1000 (Left Side)

No.	Name	Function
(1)	Power Connector	Connects the power cable (supplied) to the main unit.
(2)	Power Switch	Turns main unit power ON or OFF. Pressing ○ turns the power OFF. Pressing   turns the power ON.

## 2. Names and Function of Parts

### 2.2.3 CHIP-1000 Unit (Right Side)

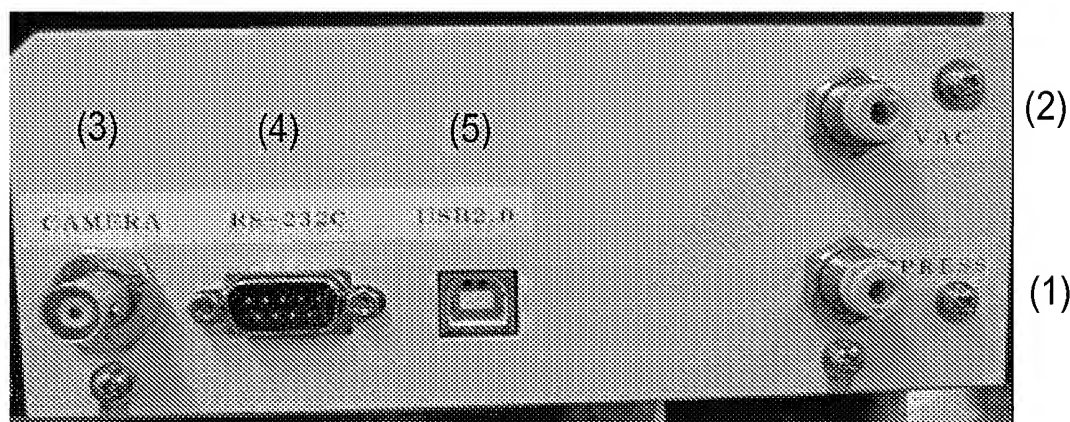
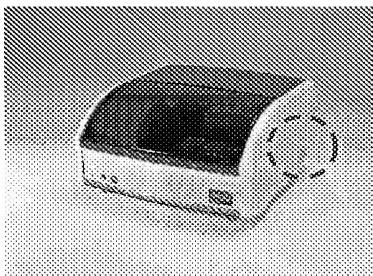


Fig. 2.2.3 CHIP-1000 (Right Side Interface Unit)

No.	Name	Function
(1)	Positive Pressure Port	Connects to the pump unit's positive pressure port.
(2)	Negative Pressure Port	Connects to the pump unit's negative pressure port.
(3)	BNC Connector	Outputs the print monitor image to the personal computer.
(4)	RS-232C Connector	Equipment control I/O. Connects the RS-232C cable.
(5)	USB2.0 Connector	Outputs the sample image captured with the scanner to the personal computer. Connects the IEEE1394 cable.

## 2.3 CHIP-1000 Unit Parts

### 2.3.1 Top Cover

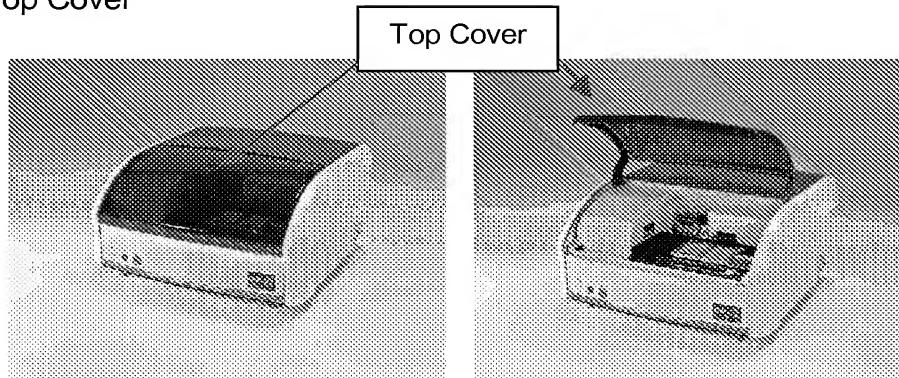


Fig. 2.3.1 Top Cover Appearance (Opened and Closed)

The CHIP-1000 unit is equipped with an acrylic resin top cover that prevents dust and wind from entering the equipment and helps ensure operator safety during operation. Also, after completing any work inside the CHIP-1000 unit, be sure to close the top cover.



### **CAUTION**

Do not drop or place heavy objects on the top cover of this unit.  
Doing so can result in operator injury and equipment damage.



2. Names and Function of Parts

2.3.2 Table

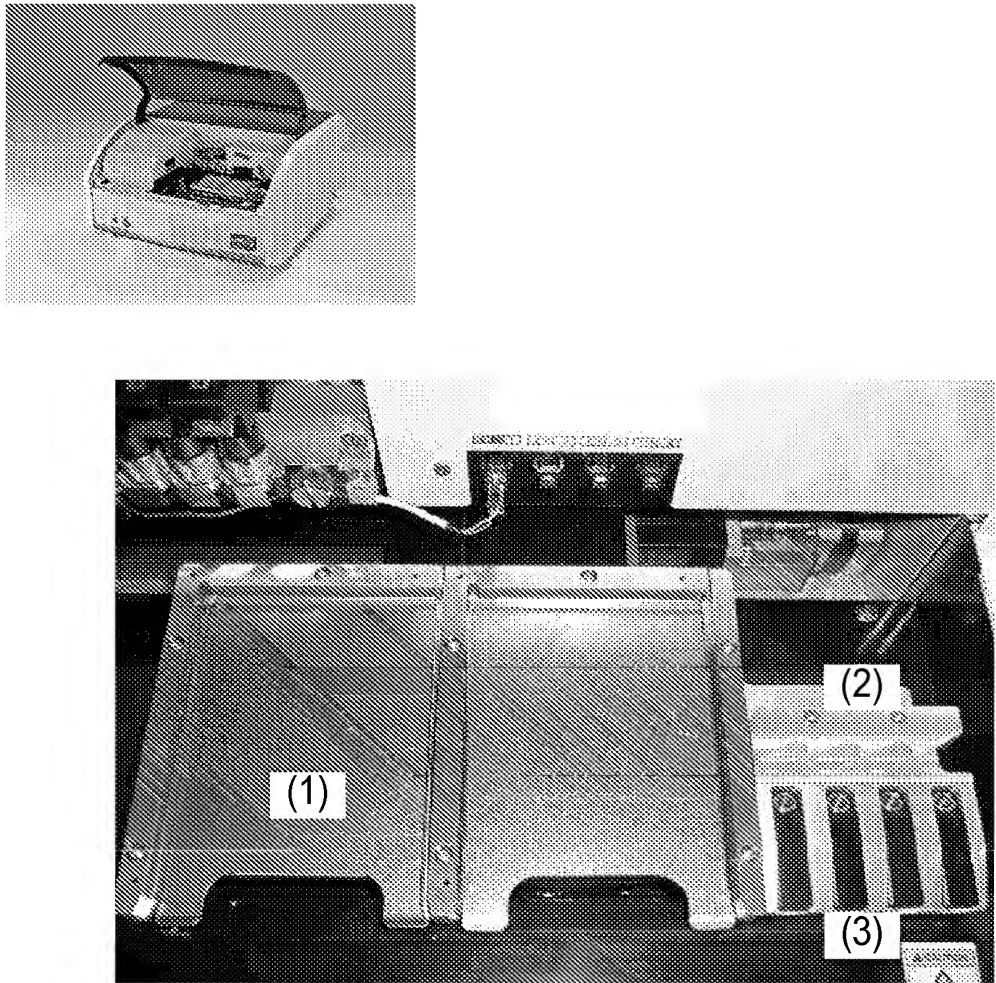


Fig. 2.3.2 Table

No.	Name	Function
(1)	Sample Plate Mount	Holds up to two sample pates (Fig. 2.3.3).
(2)	Test Printing Section	Used to create a test print when replenishing or cleaning the piezo device.
(3)	Piezo Maintenance Section	Used to manually clean reagent from the piezo orifice.



## 2.3.3 Print Head

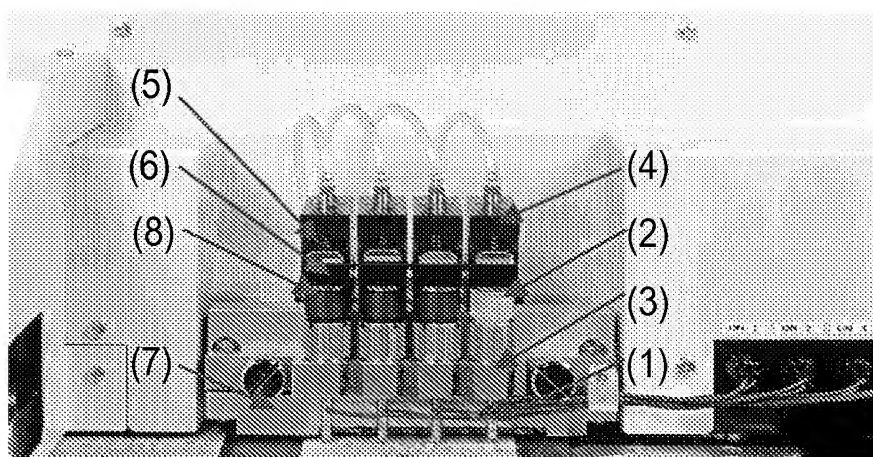
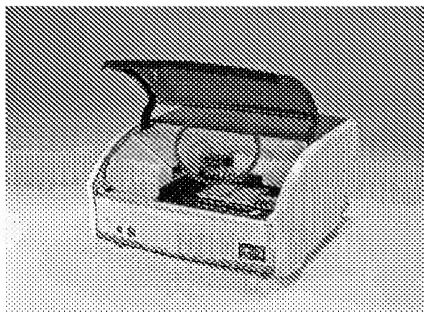


Fig. 2.3.4 Print Head

The print head prints onto a sample using the OSV's reagent.

Up to four reagents can be dispensed. Channel numbers are 1, 2, 3 and 4, from left to right.

No.	Name	Function
(1)	Piezo Device	Key device that controls reagent dispensing
(2)	OSV (One Shot Vessel)	Disposable vessel filled with reagent
(3)	OSV Holder	Holder for the OSV and the piezo device
(4)	Lever	Held down when the OSV is set in place. Plunger (6) presses against the OSV.
(5)	Release Lever	Releases the plunger (6).
(6)	Plunger	Holds the OSV during reagent dispensing and creates an air-tight seal for air pressure control.
(7)	Lighting Unit	Uses an LED to provide lighting for the (monitor) camera
(8)	Dummy OSV	Inserted in a piezo device where nothing will be dispensed to prevent dust from entering the unit. Can be attached if the power is ON or OFF.

## 2. Names and Function of Parts

### 2.3.4 Vacuum Pressure Adjustment Knobs

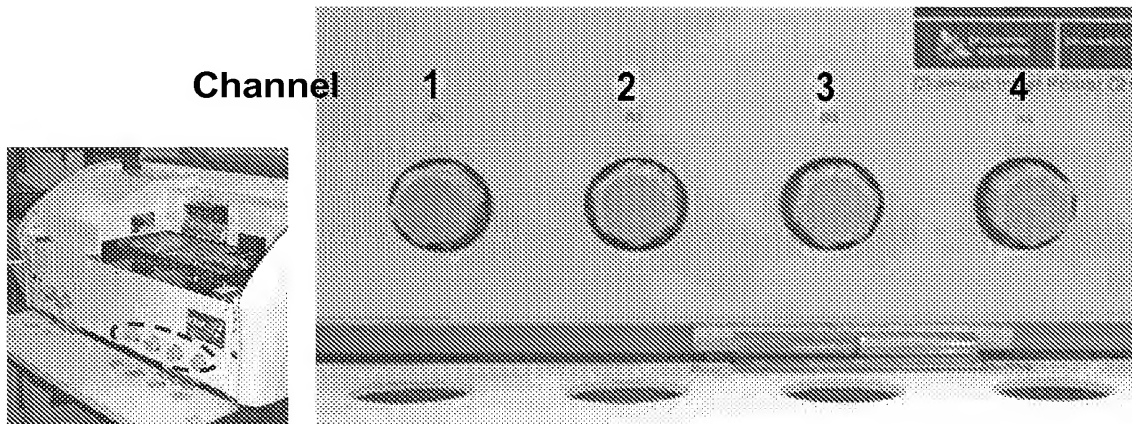


Fig. 2.3.5 Vacuum Pressure Adjustment Knobs

These knobs are used for adjusting vacuum pressure (channels 1 to 4). Turning each knob clockwise increases the degree of vacuum, and turning counter-clockwise both decreases the degree of vacuum and approaches the ambient pressure.

#### **IMPORTANT**

- Regardless of whether the CHIP-1000 unit is ON or OFF, be sure to attach a dummy OSV to any non-dispensing piezo device to prevent dust from entering the unit.
- If no dummy OSV is attached or if the plunger is not lowered, be sure to turn the knob fully counterclockwise.

### 2.3.5 Push Buttons and Status Lamps

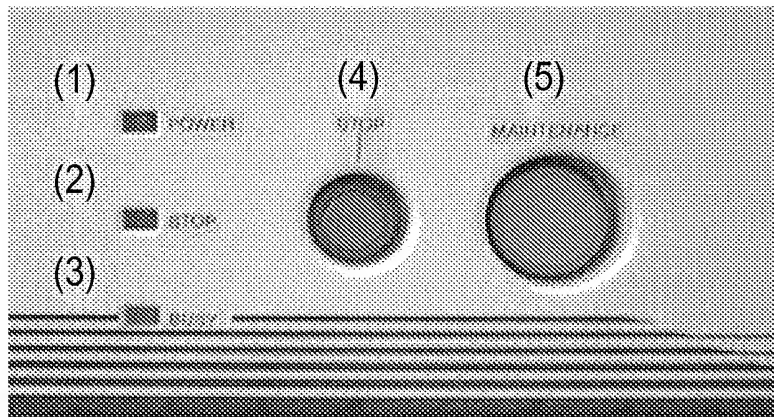
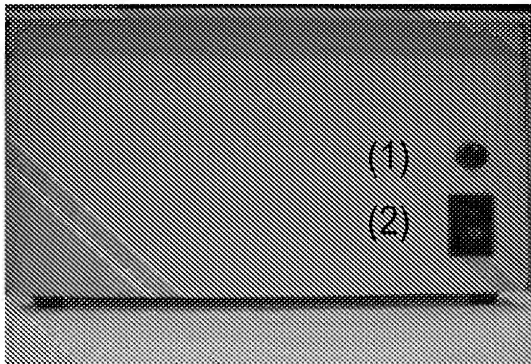
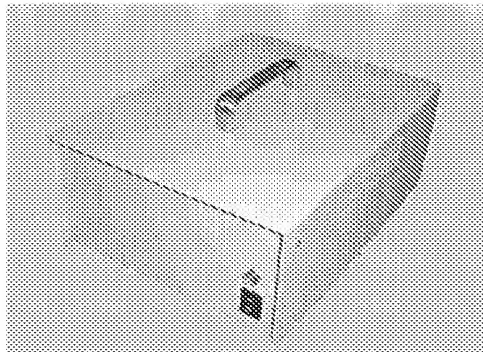


Fig. 2.3.6 Push Buttons and Status Lamps

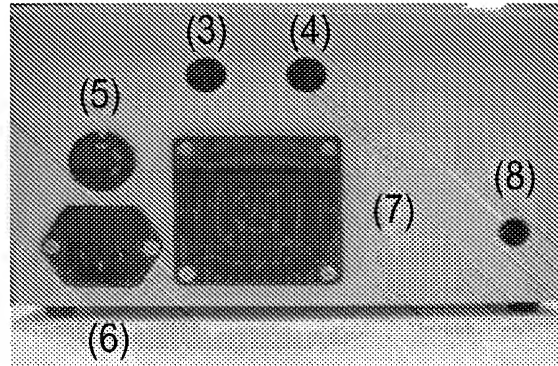
No.	Name	Function
(1)	POWER LED	Indicates that the power is turned ON. (Green)
(2)	STOP LED	Lights when the equipment is stopped by means of the STOP button or stop function. When this LED is lit, no other operation can be performed until the system is reset. (Red) For details, refer to 6.4 System Reset
(3)	BUSY LED	Indicates the equipment is busy. (Orange)
(4)	STOP Button	Stops the equipment during operation. STOP LED lights immediately after the equipment stops. When this LED is lit, no other operation can be performed until the system is reset. (Red) For details, refer to 6.4 System Reset
(5)	Maintenance Button	Moves the table to the piezo orifice wipe position.

## 2. Names and Function of Parts

### 2.4 Pump Unit



Front



Rear

Fig. 2.4.1 Pump Unit

No.	Name	Function
(1)	POWER LED	Indicates that the CHIP-1000 unit's power is turned ON.
(2)	Power Switch	Turns the CHIP-1000 unit's power ON or OFF. Pressing ○ turns the power OFF. Pressing   turns the power ON.
(3)	Positive Pressure Port	Connects to the main unit's positive pressure port.
(4)	Negative Pressure Port	Connects to the main unit's negative pressure port.
(5)	Voltage Switch	Switches between voltages (100/115/230 VAC).
(6)	Power Connector	Connects the power cable to the CHIP-1000 unit. (Included with CHIP-1000 unit and equipped with built-in fuse)
(7)	Cooling Fan	Cools the inside of the CHIP-1000 unit.
(8)	Exhaust Port	Exhausts air from the pump unit.